A. KRAUTH.

PAPER FEEDING AND SEVERING MECHANISM FOR MANIFOLDING MACHINES.

APPLICATION FILED JUNE 28, 1913.

1,098,512.

Patented June 2, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

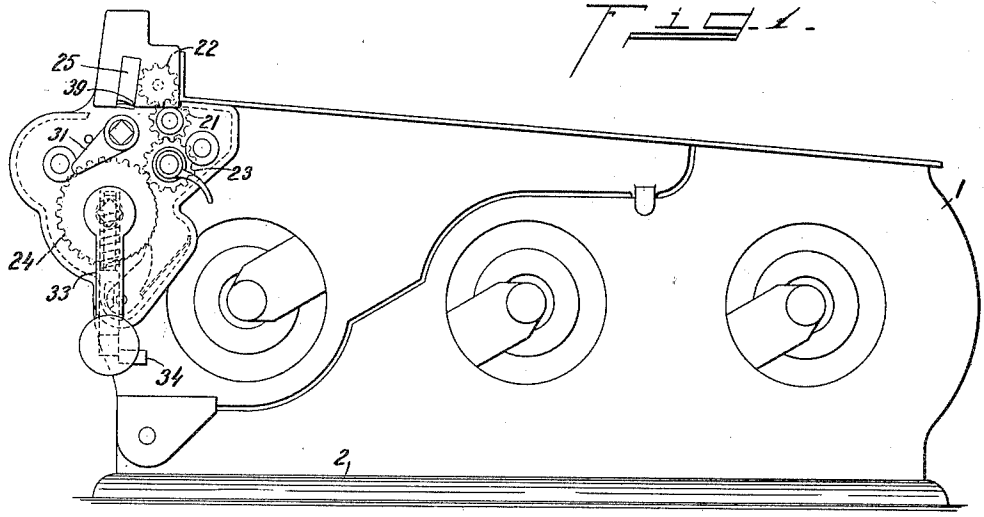


Fig. 2.

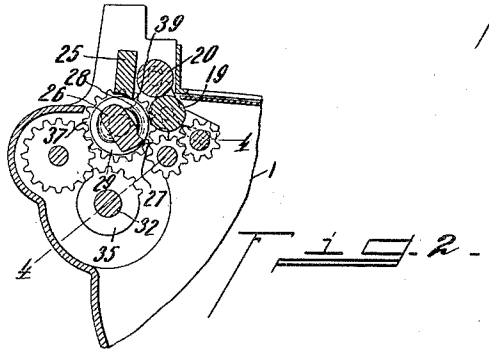


Fig. 3.

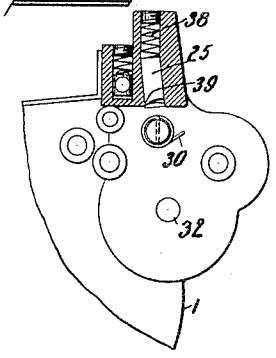


Fig. 5.

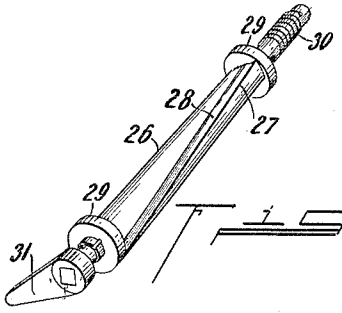
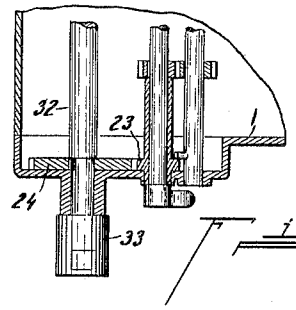


Fig. 4.



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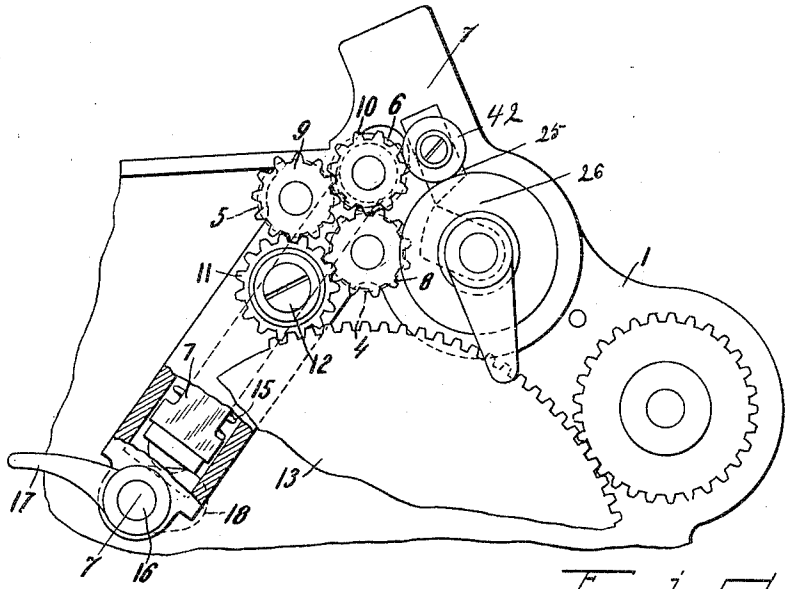


Fig. 6.

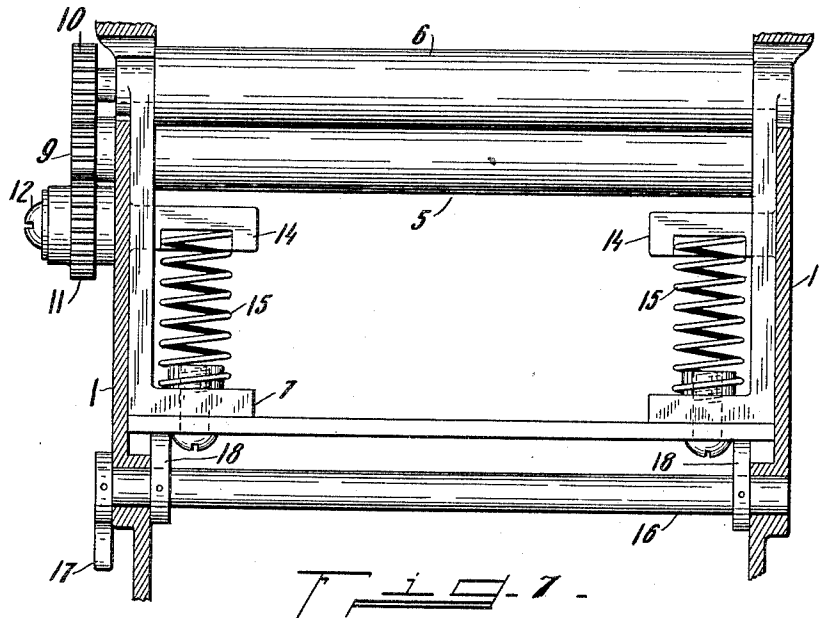


Fig. 7.

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PAPER FEEDING AND SEVERING MECHANISM FOR MANIFOLDING-MACHINES.

1,098,512. Specification of Letters Patent. Patented June 2, 1914.

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To all whom it may concern:

Be it known that I, ALBERT KRAUTH, a citizen of the United States, residing at Hamilton, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Paper Feeding and Severing Mechanism for Manifolding-Machines, of which the following is a specification.

My invention relates to an improvement in a paper feeding and severing mechanism which is capable of conjoint or separate use, and is primarily designed for use in manifolding machines or autographic registers for feeding a continuous strip of paper and severing the same into predetermined lengths.

The propelling mechanism of the apparatus shown, is of such type as to advance or feed the paper in constant invariable lengths upon each complete rotation of a crank handle.

The crank handle is checked or arrested after each cycle or interval, requiring manual release for a successive operation.

The feeding mechanism preferably comprises coacting rolls positively rotated and in geared connection with the crank handle, while the severing mechanism comprises an oscillating cutter member having its cutting edge longitudinally spiral so that in its cutting stroke it will be moved progressively tangent to a relatively stationary cutting member in a direction coincident with the feed of the paper.

As a preferred type of feeding mechanism, a series of rolls, three in number are provided, two parallel, with their axis in the same plane and journaled in rigid bearings formed in the side frames of the machine, while a third roll is journaled upon a movable bearing frame slidable upon the side frames, moving said roll and frame as a unit for yieldingly maintaining the periphy of the roll in contact with the peripheries of its companion rolls. The rolls of the series are all in geared connection for positive rotation in the same direction at their points of tangency.

An object, therefore, of my invention is to provide an oscillating cutter member bent spiral longitudinally adapted to move in a direction with the feed of the paper to be severed across a relatively stationary cutting member disposed diametrically with the axis of the oscillating cutter member. The stationary cutter member engages annular flanges at each end of the oscillating cutter member to define its limit of movement toward the axis of the oscillating cutter member.

Another object of my invention is to provide a series of rolls in parallelism arranged so that the peripheries are in relative serial engagement and each positively rotated and and in a direction relatively to move their tangent surfaces in the same direction to advance a strip of paper fed between them.

Another object of my invention is to provide one or more rolls journaled in fixed bearings, and a second roll journaled in a movable bearing member with its periphery engaged with the fixedly journaled rolls, and tension means engaging the journal member under an equalizing pressure to frictionally urge said movable roll longitudinally against its relatively stationary journaled rolls, and further, in the provision of mechanism for positively moving said journal member to separate said roll contact.

Other objects will be in part obvious from the annexed drawings, and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts, and arrangement of elements deducible therefrom, and in the unique relations of the members all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by numerous modifications in structure, relation, steps and sequence thereof contemplated by this invention, drawings depicting a preferred form have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a side elevation of a manifolding apparatus containing my improved severing mechanism. Fig. 2 is a central vertical section through the forward portion of the machine. Fig. 3 is a mutilated side elevation of the forward portion of the machine opposite from that shown in Fig. 1. Fig. 4 is a section on line 4, Fig. 2. Fig. 5 is

a perspective view of the oscillating cutter. Fig. 6 is an enlarged detailed view of the preferred form of feeding mechanism in its application to manifolding machine or autographic register with parts thereof shown in section for clear observation. Fig. 7 is a section on line 7—7 of Fig. 6.

In Figs. 1, 2 and 3, I have illustrated a well-known type of construction of feeding mechanism, comprising a pair of coacting rolls having their peripheries frictionally engaged combined with the paper severing mechanism, but the preferred type of paper feeding mechanism is shown in Figs. 6 and 7.

The description herein will be primarily directed to the paper feeding and severing mechanism and their relative coöperation. The machine is provided with the parallel side frames 1—1 mounted upon a base board 2. These side frames may be of any style or design, or of two part form as shown by Fig. 1. Between the side frames the supply webs of paper are mounted and journaled upon suitable supports which may be of any well-known construction common in the art. The strips of paper are fed over a writing table, to the paper feeding rolls between which they are held to advance the paper a predetermined length within a prescribed operation of the paper feeding rolls.

4 and 5 represent companion rolls journaled in fixed bearings in the side frames 1 with their axes in the same plane but with their peripheries spaced so as not to engage each other. A third roll 6 is journaled in the yoke frame 7 mounted to permit the periphery of the roll 6 to engage with the peripheries of rolls 4 and 5 providing two points of contact for the paper fed between said rolls to increase the traction pull upon the paper, thereby insuring a more effective feed.

The paper is fed between the engaging surface of the rolls which are rotated positively by means of gearing to insure their revolution at their tangent points in the direction desired for the feed of the paper. Each roll is provided with a gear, which are intermeshed with each other in series, so that all must rotate simultaneously in their appropriate directions.

The roll 4 has a gear 8, roll 5 a gear 9, and roll 6 a gear 10, with gears 8 and 9 intermeshed with gear 10 but not with each other, while gears 8 and 9 are illustrated as both intermeshed with a gear 11 as an intermediate of the primary driving mechanism. This is permissible because rolls 4 and 5 rotate in the same direction although it is obvious that gear 11 could mesh with either one of gears 8 or 9 to accomplish the same result. The gear 11 is shown as journaled upon a stud pin or screw 12 and adapted to intermesh with a master gear 13 preferably of segmental form, the function of which will be more fully hereinafter described. It is obvious, however, that any form of propelling mechanism could be employed for rotating the feeding rolls 4, 5 and 6, than the particular type herein disclosed, which has more special reference to the conjoint use with the severing mechanism for producing a non-rotative interval for the feeding rolls during a paper severing operation in each manipulating cycle.

The construction of paper feeding mechanism shown in Figs. 1 and 3 comprising a well-known type, in which the movable roll is journaled in slide blocks one mounted in each of the side frames, with a spring for each engaged therewith for yieldingly directing the movable roll toward its companion roll. Such construction, however, is expensive to manufacture and requires careful machining and adjustment so as to equalize the tension longitudinally throughout the length of the rolls, for otherwise one edge of the paper would not be gripped as firmly as its opposite edge. This will cause the paper to slip in an irregular line, disturbing the alinement and registry of the several sheets fed as a unit, and also disturb the predetermined length advance desired in each feeding cycle to bring the sheets, which contain preprinted forms, in proper registry or alinement with the severing mechanism or discharge edge of the machine.

In providing a movable roll or rollers, if more than one are employed, with a bearing member as a unit, the pressure upon the roll is equalized longitudinally its entire length. The structure can also be built more rigidly and in more substantial form, without increasing the size of the machine. The yoke frame 7 has its limbs engaged with the side frames and slidably mounted below the plane of the writing table and projecting between the axes of the rolls 4, 5, to receive the axis of roll 6.

In the preferred form illustrated each casing 1 is provided with a lug 14, recessed to form a seat for one end of the spring 15. The opposite end of the spring engages with the cross bar of the yoke frame 7. The springs are of such pitch and strength as to exert the proper pressure required, and, therefore, no means for adjusting the tension need be provided, although it is obvious that provision therefor could be made. Two springs are shown, one adjacent each limb of the frame to equalize the movement of the yoke frame and prevent lateral displacement and thereby obviate a binding engagement of the yoke frame with the side frames.

In loading the machine, it is desirable to separate the rolls from their peripheral frictional engagement so that the paper can be easily threaded between them, and this I accomplish by moving the yoke frame and

its roll upwardly, with the mechanism arranged to maintain the rolls in a disengaged position.

16 represents a rock shaft journaled in the side frames, one end provided with a hand lever 17 for manually rocking the same.

18 represents cams or lever arms fixed to the rock shaft 16 preferably one at each end thereof, adapted to engage the cross bar of the yoke frame 7 to move the same upwardly when it is desired to disengage the roll 6 from the companion rolls 4, 5, for inserting the paper between the paper feeding rolls. In providing two lever arms one at each end of the frame the movement is equalized so as to prevent binding of the yoke frame with the side frames, although it is obvious that a single arm could be utilized to accomplish the same result.

In the form of feeding mechanism shown in Figs. 1 and 2, the lower roll 19 represents the stationary journaled roll, while the upper roll 20 represents the movable roll yieldingly urged against the lower roll with both rolls, geared together by gears 21, 22, fixed to their respective roll axis and with the gear 21 intermeshed with the intermediate gear 23. The gear 23 is intermeshed with the master gear 24 which is substantially equivalent to the master gear 13, shown in Fig. 6.

Paper severing mechanism.—The paper severing mechanism comprises a pair of coacting cutter members 25, 26, in which the cutter member 26 is rotatively mounted and capable of moving in a direction with the feed paper. It is formed of a bar bent spirally, longitudinally, having a cutting edge 27, and clearance groove 28, beneath the cutting edge, and the surface in rear of the cutting edge being beveled or tapering for clearance. At each end of the cutter bar annular disks 29, 29, are provided, adapted to be engaged by the cutter member 25, which is yieldingly urged toward the axis of the rotative cutter member 26, to limit such movement and thereby prevent the cutter 25 from moving beyond the arc of movement of the cutting edge 27.

The axis of the cutter member 26 journals in the side frames 1 of the machine, one end thereof provided with a spring 30 fixed thereto and to the side frame to automatically return the cutter to a normal position after each cutting operation. The opposite end of the axis of the cutter 26 is provided with an arm 31, projected exterior of one of the side frames to provide means for manually moving the cutter, which arm is also adapted to engage stops on the side frame to limit the reactionary movement of the cutter.

The transmission mechanism employed for moving the cutter 26 is comprised in a series of gears in connection with the main driving shaft 32, journaled in the side frames which is rotated by crank handle 33. This crank handle is arranged to engage a stop 34 at each revolution thereof to limit the cycle of operation to produce a constant invariable feed of the paper of predetermined length, requiring a manual release for a second operation. This, however, is merely a secondary feature in the invention herein.

The master gear 13 of the paper feeding mechanism receives its motion from the shaft 32 and may be directly connected therewith or intermediate gearing may be provided for establishing a differential motion between the master gear and crank handle.

35 represents a segmental gear fixed to the shaft 32, its teeth adapted to intermesh, in each rotation of the gear, with the intermediate gear 36, which gear in turn is intermeshed with a gear 37 fixed to the axis of the cutter member 26. The segmental gears 13 and 35 are relatively arranged upon their shaft, so that the one will function as a transmitter during the non-transmitting interval of the second. Thus the paper will be fed its desired length before the cutter mechanism is operated with the paper feed dormant during the operation of the cutter mechanism.

The segmental gear 35 in itself also provides a release for the cutter mechanism to permit the cutter member 26 to be oscillated, swinging to its normal position by the confined pressure of the spring 20, as soon as the teeth of the segmental gear 35 are disengaged from the teeth of the intermediate gear 36. The cutter member 25 is slidably mounted within grooves formed in the side frames with a spring 38 provided at each end thereof, bearing against the same and exerting its pressure downwardly upon the cutter member to urge its cutting edge 39 toward a cutting engagement with the cutting edge of the cutter member 26.

It is obvious that the gearing could be arranged to produce a rotative action upon the cutter member 26 instead of an oscillatory movement herein shown by arranging the relative gearing between the feeding and cutting mechanism to bring the cutting edges into action at the proper time after a desired length advance of the paper.

As illustrated in Fig. 6, I have provided the rotative cutter member 26 at each end thereof with a roller 41, each adapted to engage respectively with rollers 42 journaled upon the ends of the cutter member 25 to limit the movement of the cutter member 25 toward the rotative cutter member 26, and relieve the parts of friction, which form may be regarded the equivalent as that illustrated in Figs. 2 and 5.

Without further elaboration, the foregoing will so fully reveal the gist of this in-

vention that others can by applying current knowledge readily adapt it for various applications without omitting certain features, that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed my invention I claim as new and desire to secure by Letters Patent of the United States:—

1. A device of the nature disclosed combining an oscillating cutter member longitudinally spiral having an annular guide flange at each end thereof and a longitudinal spiral cutting edge extended from the axis of said member approximately coincident with each annular flange radius, a non-rotative cutter member disposed diametrically with the axis of said oscillating cutter member and yieldingly engaging said guide flanges, a crank handle, transmission elements connecting said crank handle and oscillating cutter member for positively moving its cutting edge toward its opposing cutter member, means for automatically returning said cutter member to normal, and a crank arm on the axis of said oscillating cutter member to limit its reactionary movement.

2. A device of the nature disclosed combining a pair of coacting paper feeding rolls, a pair of coacting cutter members adjacently parallel with said feeding rolls, comprising an oscillating cutter member longitudinally spiral having an annular guide flange at each end thereof and a longitudinally spiral cutting edge extending from the axis of said member approximately coincident with each annular flange radius and moving in a cutting operation in a direction with the feed of the paper to be severed, a non-rotative cutter member disposed diametrically with the axis of said oscillating cutter member and yieldingly engaging said guide flanges, a crank handle, transmission elements connecting said crank handle and oscillating cutter member and said feeding rolls for operating the same in relative successive intervals in a functioning direction upon each cycle of said crank handle, and means for automatically reversely moving said oscillating cutter member to normal.

3. A device of the nature disclosed combining three rolls, gearing connecting the same for positive relative rotation thereof, one of said rolls yieldingly mounted for peripheral friction engagement with the peripheries of the companion rolls.

4. A device of the nature disclosed combining a series of rolls, one thereof having its peripheral surface engaged with the remainder series of rolls, a gear fixed to the axis of each roll with the gear of said aforesaid roll intermeshed with the gears of the other rolls of the series to rotate the same in an opposing direction, and means for propelling said rolls.

5. A device of the nature disclosed combining three rolls, one thereof having its periphery engaged with the peripheries of the others, means for positively rotating said rolls in a relative direction to advance a strip of paper when fed between the roll-engaging peripheries, and means for engaging said rolls yieldingly toward their engaging surfaces.

6. A device of the nature disclosed combining a frame, a roll journaled in bearings in said frame, a second roll supporting frame slidably mounted and guided upon said first-named frame, a roller journaled thereon relatively axially parallel with said first-named roll, and tension means for urging said frame to frictionally peripherally engage said rolls.

7. A device of the nature disclosed combining oppositely disposed supports, a member slidably mounted upon said supports, a roll journaled thereon, a second roll journaled in rigid bearings, longitudinallly parallel with said first roll, tension means for said member for yieldingly urging the periphery of said first roll into frictional engagement with the periphery of said second roll, and gearing for positively rotating said rolls.

8. A device of the nature disclosed combining oppositely disposed supports, a member slidably mounted upon said supporting members, a roll journaled thereon, a second roll journaled in rigid bearings longitudinally parallel with said first roll, tension means for said member for yieldingly urging the periphery of said first roll into frictional engagement with the periphery of said second roll, and means for separating said rolls for non-peripheral engagement.

9. A device of the nature disclosed combining two relatively parallel rolls journaled in fixed bearings, a third roll journaled intermediate of said two rolls having its periphery engaged with each, a movable journal member supporting and journaling the ends of said third roll, and tension means engaging with said member at relative equalizing portions for yieldingly urging said third roll against its opposing companion rolls.

10. A device of the nature disclosed combining two relatively parallel rolls journaled in fixed bearings, a third roll journaled intermediate of said two rolls having its periphery engaged with each, a movable journal member supporting and journaling the ends of said third roll, tension means engaging with said member at relative equalizing portions for yieldingly urging said

third roll against its opposing companion rolls, and a gear fixed to the axis of each of said rolls in series intermediate with each other.

11. A device of the nature disclosed combining two relatively parallel rolls journaled in fixed bearings, a third roll journaled intermediate of said two rolls having its periphery engaged with each, a movable journal member supporting and journaling the ends of said third roll, tension means engaging with said member at relative equalizing portions for yieldingly urging said third roll against its opposing companion rolls, a gear fixed to the axis of each of said rolls in series intermediate with each other, and means for positively moving said frame against its spring pressure for separating the peripheral engagement of said rolls.

In testimony whereof, I have hereunto set my hand.

ALBERT KRAUTH.

Witnesses:
OLIVER B. KAISER,
LOUISE A. BECK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."